BLOOD VESSEL SIZING DEVICE

CROSS REFERENCE TO RELATED APPLICATION

This application is a continuation of U.S. patent application Ser. No. 13/427,084, which was filed on Mar. 22, 2012, entitled "Blood Vessel Sizing Device," which is incorporated herein by reference in its entirety for any and all non-limiting purposes.

BACKGROUND

The present disclosure relates generally to medical devices and more specifically to medical devices for determining or measuring blood vessel size during, for example, an angiogram.

Determining blood vessel size quickly and accurately is important, for example, when treating stenotic vessel with angioplasty or stent. If blood vessel size is incorrectly determined, a stent that is too large for the actual blood vessel size could be selected. Using an oversized stent can damage, dissect or even perforate the blood vessel.

Diagnostic imaging using, for example, X-ray machines, computer tomography machines or magnetic resonance imaging machines, generate images of blood vessels including any narrowing of blood vessels. A clinician uses these images to determine blood vessel size and stenosis. But using such images has inherent limitations. For example, computer tomography imaging accuracy can be affected by sampling, size of display field of view and/or intravascular density of a contrast material. During emergency procedures, computer tomography or magnetic resonance imaging measurements may not be available.

A need accordingly exists for medical devices and methods that improve the process of determining blood vessel size during, for example, angiographic procedures.

SUMMARY

The present disclosure is directed to medical devices and methods for determining blood vessel sizes based upon, for example, angiographic images of the vessels. Such blood vessel images can be generated, for example, via angiograms. In an embodiment, a blood vessel sizing device includes a marker configured placement on the skin of a patient near a blood vessel to be imaged. The marker defines a substantially circular shape and includes a plurality of radiopaque or radiodense at least substantially concentric circles. When a computer machine generates an angiographic image of the blood vessel, the radiopaque circles cause the circles to be visible on the generated image (along with the blood vessel image). A clinician can quickly and accurately determine the actual size of the blood vessel size by comparing the blood vessel image to the image of the concentric circles, which have a known or illustrated dimension.

In an embodiment, the marker is adhesive so that a user can easily secure or place the marker onto the skin of a patient. In various embodiments, the marker includes a plurality of different radiopaque or radiodense symbols such as numbers or geometric shapes that are also visible on the machine generated image. The symbols each represent a diameter of one of the plurality of substantially concentric circle, which enables a user to quickly and accurately determine the actual size of the blood vessel based upon the generated image. In one embodiment, the radiopaque circles range from about 2 mm to about 20 mm in diameter. In various embodiments, the marker includes four substantially concentric radiopaque circles having diameters of 4 mm, 6 mm, 8 mm and 10 mm. In alternative embodiments, the four substantially concentric radiopaque circles have diameters of 14 mm, 16 mm, 18 mm and 20 mm.

In another embodiment, a blood vessel sizing method includes placing a marker having a plurality of radiopaque substantially concentric circles on the skin of a patient, generating an image of the patient's blood vessel and the circles, and then comparing the image of the blood vessel to the image of at least one of the concentric circles to determine the actual size of the blood vessel. The image can be generated using, for example, an angiogram.

The actual size of the blood vessel is determined by measuring a diameter of the imaged blood vessel and comparing the measured diameter to at least one of the images of plurality of radiopaque substantially concentric circles. A mechanical instrument (e.g., calipers) can be used in an embodiment to measure the diameter of the imaged blood vessel and compare it to the plurality of radiopaque circles.

It is accordingly an advantage of the present disclosure to provide a medical device that simplifies and improves blood vessel size determination.

It is a further advantage of the present disclosure to provide a method for improving the process for blood vessel size determination.

Additional features and advantages are described herein, and will be apparent from the following Detailed Description and the figures.

BRIEF DESCRIPTION OF THE FIGURES

FIG. **1** is a top view of a medical device of the present disclosure illustrating a marker having a plurality of radiopaque substantially concentric circles.

FIG. **2** illustrates a representation of a computer generated image of a blood vessel and of the medical device of FIG. **1** including the plurality of concentric circles of the marker.

DETAILED DESCRIPTION

The present disclosure is directed to medical devices and methods for determining blood vessel size based upon machine generated images of the blood vessel. Such images can be generated, for example, via an angiogram.

FIG. **1** illustrates an embodiment of a medical device **10** of the present disclosure, which includes a marker **11** defining a substantially circular shape. Marker **11** is configured to be placed on the skin of a patient and has a plurality of radiopaque substantially concentric circles **12**, **14**, **16**, **18**. In an embodiment, a surface of marker **11** includes an adhesive that enables maker **11** to be quickly and easily stuck to or secured to the patient's skin. Marker **11** has an outside diameter that is larger than the diameter of outermost radiopaque concentric circle **18**. Marker **11** also includes radiopaque symbols **12***a*, **14***a*, **16***a* and **18***a*, each of which represents a corresponding diameter of concentric circles **12**, **14**, **16** and **18**. For example, FIG. **1** illustrates four radiopaque numerical symbols of 10 mm, 8 mm, 6 mm and 4 mm, which represent the diameters of concentric circles **12**, **14**, **16** and **18**, respectively. It should be appreciated that symbols **12***a*, **14***a*, **16***a*, **18***a* can be any suitable symbols representing the diameter of concentric circles **12**, **14**, **16** and **18**. In an embodiment, the symbols are a plurality of different geometric shapes, such as triangles, circles, squares and pentagons, each representing the diameter of one of the circles **12**, **14**, **16** and **18**.